UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

JUN 21 2013

Herschel T. Vinyard
Secretary
Florida Department of Environmental Protection
3900 Commonwealth Boulevard
Tallahassee, Florida 32399-3000

Dear Secretary Vinyard:

The U. S. Environmental Protection Agency has completed its review of the site specific alternative criterion (SSAC) for total nitrogen (TN) for the marine segments of the Lower St. Johns River (LSJR). The Florida Department of Environmental Protection submitted the revised Chapter 62-302, including the SSAC, to the EPA on June 13, 2012, as new or revised water quality standards with the necessary certification by the FDEP general counsel, pursuant to 40 CFR Part 131. The SSAC was included in the list of site specific numeric interpretations of paragraph 62-302.530(47)(b), Florida Administrative Code (F.A.C.), referenced in paragraph 62-302.531(2)(a), F.A.C. and published at FDEP's website at: http://www.dep.state.fl.us/water/wqssp/swq-docs.htm. FDEP submitted the numeric interpretation of the state narrative nutrient criterion for WBIDs 2213A, 2213B, 2213C, 2213E and 2213F expressed in the LSJR Total Maximum Daily Load report as the SSAC. FDEP intends for the SSAC to serve as the numeric nutrient criterion for TN for the marine segments of the LSJR.

In accordance with section 303(c) of the Clean Water Act, I am hereby approving the SSAC for the LSJR WBIDs 2213A, 2213B, 2213C, 2213E and 2213F as a revised water quality standard for TN. Any other criteria applicable to these waterbodies remain in effect, including the requirements of paragraph 62-302.530(47)(a), F.A.C. The details of the SSAC are discussed in the enclosed documentation. We would like to commend you and your staff for your continued efforts in environmental protection for the State of Florida. If you have any questions regarding the EPA's approval, please contact me at (404) 562-9345 or have a member of your staff contact Ms. Annie M. Godfrey, Water Quality Standards Section Chief at (404) 562-9967.

Sincerely,

James D. Giattina
Director
Water Protection Division

Enclosure

cc: Thomas M. Beason, FDEP
Daryll Joyner, FDEP

Decision Document for Hierarchy 1 Site Specific Alternative Criterion For Lower St. Johns River (LSJR)

Summary Information

WBID	Description	Class	Waterbody Type *Impaired Waters Rule (IWR) Run 40*	Listing Parameter
2213A	St. Johns River above Mouth	Class III	Marine	Nutrients (Chlorophyll-*a* (chl-*a*))
2213B	St. Johns River above Intracoastal Waterway (ICWW)			
2213C	St. Johns River above Dames Point			
2213E	St. Johns River above Fuller Warren Bridge (I-95)			
2213F	St. Johns River above Piney Point			

A nutrient Total Maximum Daily Load (TMDL) for the LSJR WBIDs 2213A, 2213B, 2213C, 2213E, and 2213F was developed by the Florida Department of Environmental Protection (FDEP) and approved by the Environmental Protection Agency on September 23, 2008 pursuant to section 303(d) of the Clean Water Act (CWA). This TMDL was developed to identify the level of nutrients that would prevent an imbalance of flora and fauna as required by the state's narrative nutrient criterion at paragraph 62-302.530(47)(b), Florida Administrative Code (F.A.C.). FDEP determined that a total nitrogen (TN) load of 1,376,855 kilograms/year (kg/yr), not to be exceeded as an annual load, would meet its narrative criterion and adopted that load as a TMDL value at subsection 62-304.415(2), F.A.C. FDEP has submitted the TN load from the TMDL for EPA review as a hierarchy 1 site specific alternative nutrient criterion (SSAC) for the LSJR WBIDs 2213A, 2213B, 2213C, 2213E, and 2213F, pursuant to section 303(c) of the CWA and EPA's implementing regulations at 40 CFR Part 131. This decision document approves the SSAC for TN of 1,376,855 kg/yr, not to be exceeded as an annual load, as a hierarchy 1 criterion for LSJR WBIDs 2213A, 2213B, 2213C, 2213E and 2213F. Any other criteria applicable to this waterbody remain in effect including the requirements of paragraph 62-302.530(47)(a), F.A.C.

In a letter dated June 13, 2012, from Thomas M. Beason, General Counsel for FDEP, to Gwendolyn Keyes Fleming, Regional Administrator of the EPA's Region 4 Office, FDEP submitted the numeric interpretation of the state narrative nutrient criterion for the LSJR WBIDs 2213A, 2213B, 2213C, 2213E and 2213F as expressed in the LSJR TMDL as the SSAC for the LSJR WBIDs 2213A, 2213B, 2213C, 2213E and 2213F. This SSAC serves as the primary site specific interpretation of Florida's narrative water quality criterion for nutrients set out in paragraph 62-302.530(47)(b), F.A.C. in accordance with paragraph 62-302.531(2)(a), F.A.C. Pursuant to section 303(c) of the CWA, this revised water quality standard is subject to review and approval by the EPA since FDEP intends for this SSAC to serve as a numeric nutrient criterion for TN for LSJR WBIDs 2213A, 2213B, 2213C, 2213E and 2213F. In the June 13, 2012, letter, the FDEP General Counsel certified that the revised water quality standards were duly adopted pursuant to Florida law.

The EPA's decision to approve this criterion is subject to the results of consultation under section 7 of the Endangered Species Act with the U.S. Fish and Wildlife Service and the National Marine Fisheries Service. By approving the standard "subject to the results of consultation," the EPA retains its discretion to take appropriate action if the consultation identifies deficiencies in the standard requiring remedial action by the EPA. The EPA will notify FDEP of the results of the section 7 consultation upon completion of the action.

Description of waters for which a SSAC has been proposed

According to the TMDL, the waterbodies included in this TMDL document are segments of the LSJR and are identified as the portion of the St. Johns River between the mouth of the Ocklawaha River and the Atlantic Ocean (see map on page 5). This Decision Document addresses the marine segments of the LSJR. The LSJR is approximately 101 miles long, has a water surface area of approximately 115 square miles (mi^2), and has a 2,750-mi^2 drainage area. Major population centers within the LSJR basin include Palatka (~11,000 people) in the south, Green Cove Springs (~5,000 people) around the midpoint of the LSJR, and the Orange Park, Middleburg, and Jacksonville Metropolitan Area (over 1 million people) in the northern portion of the basin. The LSJR is a sixth-order, darkwater river estuary, and has characteristics associated with riverine, lake, and marine aquatic environments along its length. The WBIDs in this TMDL are Class III waterbodies with designated uses of recreation, propagation, and the maintenance of a healthy, well-balanced population of fish and wildlife. The LSJR is divided into the three ecological zones based on salinity including a predominantly freshwater, tidal, lake-like zone that extends from the city of Palatka north to the mouth of Black Creek, an intermediate oligohaline (brackish water with very little salt) zone extending from Black Creek northward (downstream) to the Fuller Warren Bridge/I-95 in Jacksonville and a predominantly marine zone downstream from the I-95 bridge to the river mouth. The marine WBIDs 2213A, 2213B, 2213C, 2213E and 2213F are the downstream segments in the Lower St. Johns River, extending from the mouth of the St. Johns River just east of the City of Jacksonville upstream to just below the confluence of Black Creek. The majority of flows for the Lower St. Johns are from upstream flows from the Middle St. Johns River. Major tributaries flowing into the Lower St. Johns River include Black Creek, Deep Creek, Sixmile Creek, Etonia Creek, Julington Creek, McCullough Creek, Arlington River, Broward River, Dunns Creek, Ortega River, Trout River, and the Atlantic Intracoastal Waterway.

Discussion of how the load was derived

According to the TMDL, the marine WBIDs included in this TMDL were verified as impaired for nutrients on the basis of water quality assessments of chl-*a* for marine waters. According to the IWR, marine waterbodies which are estuarine are considered impaired for chl-*a* if annual mean values exceed 11 µg/L or if annual mean chl-*a* values increase by more than 50 percent over historical values for at least two consecutive years. The marine WBIDs 2213A, 2213B, and 2213C were verified as impaired on the basis of historical chl-*a* concentrations. WBIDs 2213E and 2213F were verified as impaired for nutrients based on observed annual mean chl-*a* concentrations exceeding the 11 µg/L IWR threshold. While none of the LSJR WBIDs were verified for dissolved oxygen (DO) impairment using the IWR methodology, DO monitoring data collected by two USGS stations in the meso/polyhaline portion of the river from 1996 - 2001 indicated periods when DO concentrations were below the criterion and FDEP has

recognized these events could adversely impact aquatic fauna. Therefore the TMDL addressed the impact of nutrients on DO levels.

Nutrient impairment of WBIDs in the LSJR was also supported by a number of other indicators and studies documenting water quality problems indicative of an imbalance in the flora and fauna of the LSJR. These problems include fish kills, submerged aquatic shoreline vegetation covered in algal mats, excessive epiphyte growth, river sediment conditions indicative of low benthic animal diversity, excessive organic matter sedimentation, prolonged anoxia and the presence of potentially toxic dinoflagellates such as the *Pfiesteria*-like *Crytoperidiniopsoids* and *Prorocentrum minimum.* To address these nutrient impairments, FDEP developed a nutrient TMDL for the LSJR on December 3, 2003 which was approved by EPA on September 23, 2008. As part of this effort FDEP also developed a site specific DO criterion for the marine segments of the LSJR in 2006 that was approved by EPA on October 10, 2006.

Three computer models which addressed seasonal runoff and nutrient loads for each sub-basin, hydro-dynamically simulated nutrient movement in the river, and transformation of nutrients and effects on eutrophication were then used to develop the TMDL. For the marine WBIDs, modeled TN inputs for the worst-case year (1999) were lowered until the DO SSAC was attained. Modeling indicated that a 28.5 percent reduction in TN loads to an allowable load of 1,376,855 kg/yr would be needed to meet the DO SSAC in these WBIDs. The Nutrient TMDL for the Lower St. Johns River for WBIDs 2213A, 2213B, 2213C, 2213E, and 2213F adopted at 62-304.415(2), F.A.C. was for a TN load of 1,376,855 kg/yr, not to be exceeded as an annual load.

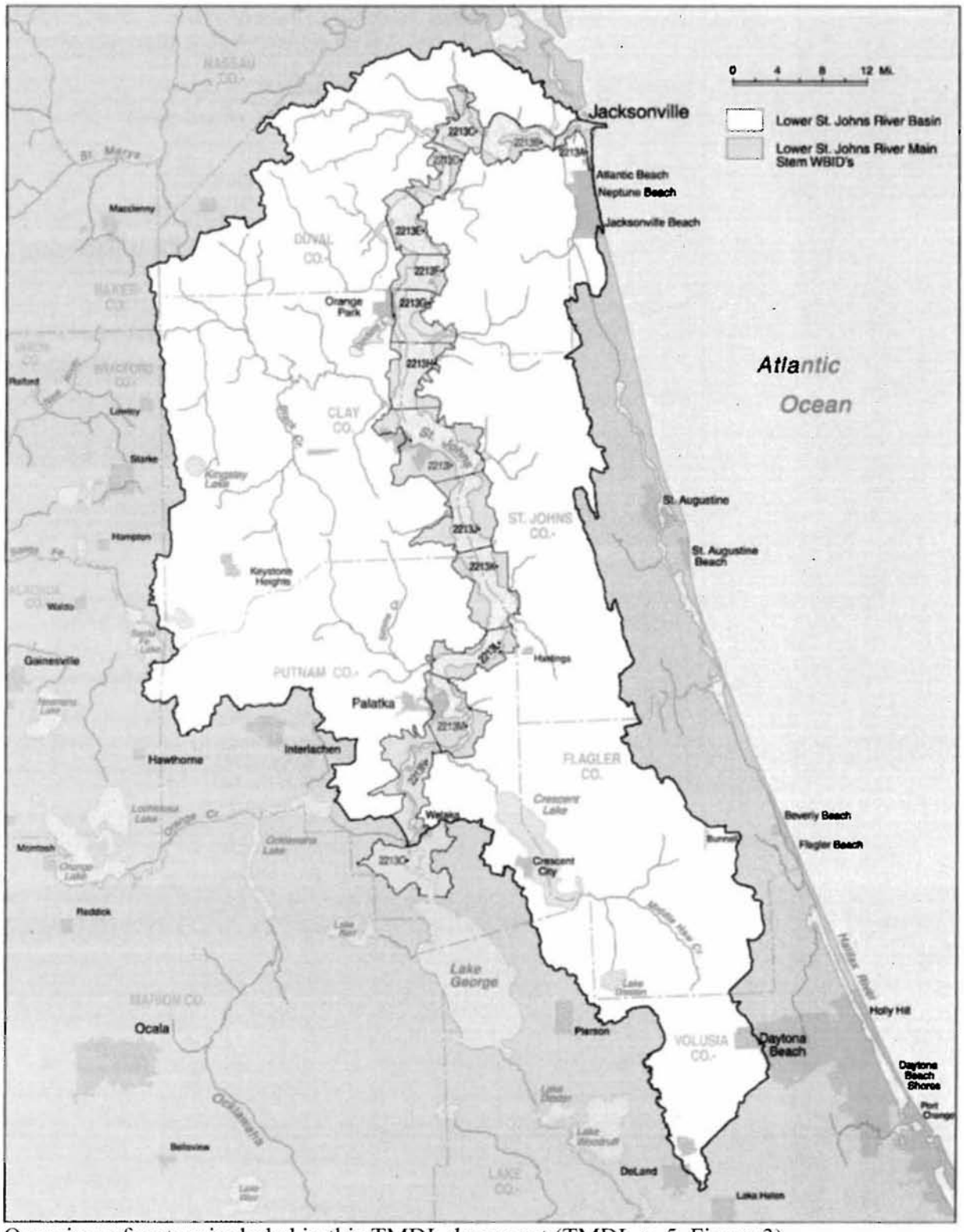
Consideration of the TMDL load as a new or revised water quality standard

FDEP used the DO SSAC as the endpoint for the marine segments in this TMDL. Three interconnected models were then used to develop a load reduction to meet the endpoint. Conservative assumptions were part of the development of the TMDL in using the worst-case year to establish necessary nitrogen load reductions, basing the percent reduction needed on ensuring that the target was met in all of the WBIDs in the marine zones and using conservative assumptions in the methodology used to establish the DO SSAC. Therefore, the reduction in TN load was determined to be protective to ensure flora and fauna balance including during times of seasonally lower DO levels.

Conclusion

Based on the chemical, physical and biological data presented in the development of the SSAC, the EPA concludes that the SSAC for TN established for the LSJR WBIDs 2213A, 2213B, 2213C, 2213E, and 2213F protects healthy, well-balanced biological communities in the waters to which the SSAC applies and is consistent with the CWA and its implementing regulations. More specifically, the SSAC is consistent with both 40 CFR Part 131.11(b)(1)(ii), and the EPA's 304(a) guidance on nutrient criteria. The TN SSAC for LSJR WBIDs 2213A, 2213B, 2213C, 2213E and 2213F of 1,376,855 kg/yr will protect water quality and aquatic life. FDEP did not address downstream protection in this TMDL. Paragraph 62-302.531(4), F.A.C. will apply to this WBID in conjunction with the Hierarchy 1 SSAC to ensure attainment and maintenance of water quality standards of downstream waters, in accordance with 40 CFR Part 131.10. In accordance with section 303(c) of the CWA, the SSAC for TN for the St. Johns River above Mouth WBID 2213A, St. Johns River above Intracoastal Waterway WBID 2213B, St. Johns River above

Dames Point WBID 2213C, St. Johns River above Fuller Warren Bridge (I-95) WBID 2213E and St. Johns River above Piney Point WBID 2213F for TN of 1,376,855 kg/yr, not to be exceeded as an annual load, is hereby approved as consistent with the CWA and 40 CFR Part 131.



Overview of waters included in this TMDL document (TMDL p. 5, Figure 3)

Appendix 1 – Summary of the TMDL Background

Name(s) of Addressed Water(s)	Lower St. Johns River – Marine portions
Waterbody Type(s)	Marine/Estuary (IWR Run 40)
WBIDs	2213A, 2213B, 2213C, 2213E, 2213F
Latitude/Longitude	NA.
Description	The waterbodies included in this TMDL document are all segments of the Lower St. Johns River (LSJR). The LSJR is identified as the portion of the St. Johns River between the mouth of the Ocklawaha River and the Atlantic Ocean. The LSJR is approximately 101 miles long, has a water surface area of approximately 115 mi^2, and has a 2,750-mi^2 drainage area. Major population centers within the LSJR basin include Palatka (~11,000 people) in the south, Green Cove Springs (~5,000 people) around the midpoint of the LSJR, and the Orange Park, Middleburg, and Jacksonville Metropolitan Area (over 1 million people) in the northern portion of the basin. The LSJR is a sixth-order, darkwater river estuary, and has characteristics associated with riverine and lake aquatic environments along its length (TMDL p. 2). There are eight marine WBIDs along the mainstem of the LSJR, extending from the mouth of the St. Johns River just east of the City of Jacksonville upstream to just below the confluence of Black Creek. Five of the eight WBIDs are verified as impaired for nutrients (TMDL p. 3-7).
Classification(s)	Class III (marine) (TMDL p. 9)
Basin	Lower St. Johns River Basin (TMDL p. 1)
Date Placed on Verified List	September 4, 2003 (TMDL p. 6)
Date TMDL was approved by EPA	September 23, 2008 (EPA WATERS database – 6/4/12 query)
Reference Streams/Lakes	NA.
Source of Majority of Flow	The majority of flows to the LSJR are from upstream flows from the Middle St. Johns River. Major tributaries flowing into the Lower St. Johns River include Black Creek, Deep Creek, Sixmile Creek, Etonia Creek, Julington Creek, McCullough Creek, Arlington River, Broward River, Dunns Creek, Ortega River, Trout River, and the Atlantic Intracoastal Waterway.[1]
Indicators	DO (marine portion) and algal biomass (freshwater portion). The DO SSAC target was based upon the protection of the acute and chronic toxicity of marine organisms to low DO levels in marine waters. Components of the target included protecting marine organisms from low DO conditions to protect aquatic community survival at acute minimum oxygen levels, growth rate of larval and juvenile life stages, and larval recruitment within the range

	established by the Criterion Minimum Concentration (CMC) and Criterion Continuous Concentration (CCC). FDEP/SJRWMD developed the DO target for marine portions of the river using an application of the methodology for the Virginian Province developed by EPA and documented in *Ambient Water Quality Criteria for Dissolved Oxygen (Salt Water): Cape Cod to Cape Hatteras*. EPA's Virginian Province approach selected DO criterion that provide protection from both acute and chronic effects of exposure to low DO levels in marine waters based upon the biological response of marine organisms. The EPA approach identified the CMC, which represents an acute toxicity, and the CCC, which represents chronic toxicity or a limitation of growth. Between the CMC and CCC, a larval recruitment model is used to provide a further evaluation of the duration and intensity of low DO to determine if a "healthy aquatic community" can be supported, by a measurement of Total Fractional Exposure. FDEP reasoned that the EPA Virginian Province could be applied to Florida since many of the species used in the EPA Virginian Province occur in Florida and the range of DO sensitivity of species in Florida generally bracket those used in the EPA Virginian Province analysis. For the LSJR DO SSAC, FDEP applied the EPA Virginian Province by setting the CMC and CCC values of 4.0 and 5.0 mg/L in contrast to the EPA Virginian Province which uses CMC and CCC values of 2.3 and 4.8 mg/L, respectively. For both the CMC and CCC, the LSJR selected values are more conservative. Between 4.0 and 5.0 mg/L, the LSJR DO SSAC applied a larval recruitment model based upon the EPA Virginian Province approach to estimate the effects of hypoxic conditions taking into consideration the intensity and duration of the low DO events. This model estimates juvenile recruitment success, incorporating parameters for larval development time, larval season, attrition rates, and patterns of vertical distribution in the water column. An additional component was added to interpret the interval between 4.6 mg/L and 5.0 mg/L, where EPA's model could not inform the methods. FDEP developed a dose-response curve for the most sensitive species from the Virginian Province approach—American lobster (*Homarus americanus*), that would add a component of protecting larval growth and a way to interpret the higher DO concentration intervals. The final equation used in the LSJR DO SSAC for Total Fractional Exposure is given here (TMDL p. 10, 95): In addition, Hendrickson and Konwinski (1998) determined that changes in river algae abundance appear to correlate significantly with changes in inorganic nitrogen and DO, with the algae heavily influencing DO (TMDL p. 8).
Identification of Causative Pollutants (as	Of the waters covered by this TMDL eleven of fifteen segments were verified as impaired for nutrients (TMDL p. 6-7). Of the five

determined by measurements of response endpoints or indicators)	marine segments, three segments (WBIDs 2213A, 2213B, and 2213C) list historical chl-*a* as the cause of impairment, while the remaining upstream two segments (WBIDs 2213E and 2213F) exceed the IWR chl-*a* threshold of 11 µg/L (TMDL p. 7, 75).
Sources and Concentrations of Nutrient Enrichment	36 NPDES permitted point sources discharge directly to the LSJR. These facilities contribute approximately 27 and 55 percent of the annual above background TN and TP loads, respectively, to the LSJR (TMDL p. 14-16). Of these 36 facilities, 31 discharge to the marine portion of the LSJR. In addition, 9 MS4s discharge to the marine portion of the LSJR (TMDL p. 78-79). Estimated average TN and TP loading to the LSJR from 1995-1999 indicated the majority of TN loading was from upstream sources while TP loading was split nearly in thirds between upstream, nonpoint, and point source contributions (calculated from Appendix D, TMDL p. 48-53): TN upstream: 68% (8,415 metric tons/yr) TN nonpoint: 17% (2,158 metric tons/yr) TN point (directly to LSJR): 14% (1,783 metric tons/yr) TN atmospheric deposition: 2% (243 metric tons/yr) TP upstream: 31% (370 metric tons/yr) TP nonpoint: 30% (360 metric tons/yr) TP point (directly to LSJR): 39% (467 metric tons/yr)
Nutrient Watershed Region in Proposed 62.302	NA. marine (IWR Run 40).
Proposed Nitrogen SSAC and Frequency	1,376,855 kg/yr TN maximum annual load (28.5% reduction) (1,027,590 kg/yr WLA from point sources and 349,265 kg/yr LA from nonpoint sources) (TMDL p. 26, 30, 32).[2]
Proposed Phosphorus SSAC and Frequency	NA. No TP endpoint applies to WBIDs in the marine portion of the LSJR (TMDL p. 30).
Biological Index Score(s) (e.g. SCI, TSI, IBI)	NA.